When $x=0$, (1) becomes

$$\frac{1}{1.2.2.3}-\frac{1}{2.3.3.4}+\frac{1}{3.4.4.5}-\frac{1}{4.5.5.6}+\ldots=\frac{\pi^2}{12}-\frac{3}{4}\ldots(3).$$

When $x=\pi$, (1) becomes

$$\frac{1}{1.2.2.3}+\frac{1}{2.3.3.4}+\frac{1}{3.4.4.5}+\frac{1}{4.5.5.6}+\ldots=\frac{7}{4}-\frac{\pi^2}{6}\ldots(4).$$

Subtracting (3) from (4), we find the sum of the given series to be $\frac{5}{4}-\pi^2/8$.

Also solved by J. Scheffer.

315. Proposed by PROFESSOR B. F. YANNEY, Mount Union College, Alliance, Ohio.

Simplify, $1-(2-(3-\ldots-(n-1)-n)\ldots)))$.

Solution by GEORGE W. HARTWELL, University of Kansas, Lawrence, Kansas, and V. M. SPUNAR, Pittsburg, Pa.

Removing the parentheses, this expression becomes

$$1-2+3-4+\ldots(-1)^{n-1}n\equiv\sum_1^n(-1)^{n-1}n.$$

But $\sum_1^n(-1)^{n-1}n=-(n/2)$ when n is even,

and $\sum_1^n(-1)^{n-1}n=(n+1)/2$ when n is odd.

Also solved by G. B. M. Zerr.

GEOMETRY.

342. Proposed by G. I. HOPKINS, M. A., Instructor in Mathematics and Astronomy, Manchester, N. H.

Given, circle DEF inscribed in triangle ABC and circumscribing the triangle DEF, D, E, F being the points of contact; AH is drawn through center, N, meeting chord DF in H. Through H is drawn BK meeting AC in K. Prove triangle ABK isosceles.

I. Solution by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

Let the points D, F, E be situated on the sides a, b, c, respectively, and also let $l=\cos^2(A/2)$, $m=\cos^2(B/2)$, $n=\cos^2(C/2)$. Then $(0, rn, rm)$; $(rn, 0, rl)$, are the trilinear coordinates of D and F, respectively.

Hence $\beta-\gamma=0$ is the equation to AN, $l\alpha+m\beta-n\gamma=0$ is the equation to DF.